UNITED
NATIONS

E

Economic and Social Council

Distr.
GENERAL

E/CN.17/1996/22
20 February 1996

ORIGINAL: ENGLISH

COMMISSION ON SUSTAINABLE DEVELOPMENT
Fourth session
18 April-3 May 1996

Protection of the atmosphere

Report of the Secretary-General

CONTENTS

	Paragraphs	Page
INTRODUCTION	1 - 3	2
I. CURRENT STATE OF THE PROBLEM, PROGRESS AND TRENDS	4 - 19	3
A. Addressing the uncertainties: improving the scientific basis for decision-making	4 - 6	3
B. Promoting sustainable development	7 - 13	4
C. Stratospheric ozone depletion	14 - 16	5
D. Transboundary atmospheric pollution	17 - 18	6
E. Conclusions	19	6
II. LINKAGES WITH OTHER PROGRAMME AREAS OF AGENDA 21	20 - 24	7
III. POLICY RECOMMENDATIONS	25 - 33	8
Policy instruments to control anthropogenic impacts	28 - 33	9
IV. ACTIONS REQUIRED AT THE NATIONAL, REGIONAL AND INTERNATIONAL LEVELS	34 - 36	10

96-03056 (E) 220296 230296

/...

INTRODUCTION

1. Chapter 9 of Agenda 21, 1/ (Protection of the atmosphere), contains four programme areas:

(a) Addressing the uncertainties: improving the scientific basis for decision-making;

(b) Promoting sustainable development:

(i) Energy development, efficiency and consumption;

(ii) Transportation;

(iii) Industrial development;

(iv) Terrestrial and marine resource development and land use;

(c) Preventing stratospheric ozone depletion;

(d) Transboundary atmospheric pollution.

2. This report reviews progress in the implementation of the objectives set out in chapter 9 since the United Nations Conference on Environment and Development (UNCED) in June 1992 and presents a set of recommendations for action. The report and its addendum were prepared by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) as task managers for chapter 9 of Agenda 21, in consultation with the United Nations Secretariat, in accordance with arrangements agreed to by the Inter-Agency Committee on Sustainable Development (IACSD). The report is based on information on progress made and experiences reported by organizations with the relevant expertise that expressed an interest in contributing to the report. That information is summarized in the addendum to this report. The report and its addendum also include extracts from a report on energy and the protection of the atmosphere prepared for consideration by the Committee on New and Renewable Sources of Energy and on Energy for Development at its second session, and it refers to the Second Assessment Report of the Intergovernmental Panel on Climate Change.

3. Protection of the atmosphere is at the very heart of sustainable development as all living organisms affect and are affected by the atmosphere. Equally, adherence to sustainable development principles will protect the atmosphere from damaging changes. Processes in the atmosphere together with those in the oceans and terrestrial systems determine climate, its variability and changes. Changes in atmospheric composition due to anthropogenic emissions of greenhouse gases and aerosols may lead to a global climate change with very significant implications for socio-economic activities. Furthermore, there is a growing realization that atmospheric processes believed to be local or regional in their impact can have significant global implications. For example, sulphate aerosols and tropospheric ozone, both of which have local health and ecological impacts, play a role in global climate change. Furthermore, the atmosphere

serves as a mechanism for chemically converting and transporting pollutants from natural and anthropogenic sources to other terrestrial and aquatic ecosystems. With increasing global population and industrial activity, improved management goals and techniques will be required to ensure protection of the atmosphere as the truly "global commons".

I. CURRENT STATE OF THE PROBLEM, PROGRESS AND TRENDS

A. Addressing the uncertainties: improving the scientific basis for decision-making

4. The separation in both time and space between cause and effect, and the potential persistence of significant impacts, present a major challenge to those providing information for policy decisions. The effects are the result of accumulating depositions of atmospheric pollutants over many years, changes in the composition of the atmosphere resulting from decades of emissions or the reaction products of emissions of both human and natural origin. Projecting impacts requires a more comprehensive understanding of the global geosphere and biosphere. In fact, some pollutants, such as persistent organic pollutants (POPs), can result in adverse environmental impacts at locations far from the source. In some cases the effects can persist for many decades and perhaps millenniums, even after corrective measures are implemented. Thus, effective policy decisions require credible long-term projections of potential impacts so that actions can be taken early enough to avoid environmental harm that may be irreversible. Compounding the problem is the current relationship between improvements in living standards and increasing emissions to the atmosphere. Despite scientific uncertainties, detailed and complex information must be condensed, simplified and provided to policy makers in a form facilitating decision-making without dictating policy.

5. In spite of these difficulties, there has been steady progress towards an improved scientific basis for policy decisions, particularly in the areas of ozone depletion and global climate change. National research programmes, and global environmental observing systems now under the inter-agency climate agenda, have provided improved understanding of the climate system, and of human impacts on it. These programmes provide an understanding of the impacts of an altered atmosphere on people and their environment. The climate agenda also integrates atmosphere-related programmes, particularly those concerning water (including the oceans). The outcome of major international programmes, such as the World Climate Programme, and international assessments of the improved knowledge have proved to be invaluable in achieving international consensus for action. The UNEP and WMO sponsored assessments under the Montreal Protocol on Substances that Deplete the Ozone Layer and the Intergovernmental Panel on Climate Change have provided consensus reports from the world's leading experts on all aspects of ozone layer depletion and global climate change issues. Developed in a dialogue between experts and policy makers, the assessments, covering atmospheric science, impacts, adaptation and mitigation options, technology opportunities, and social and economic implications, provide a basis for informed decisions. For example, in the case of ozone depletion, the assessments led to stricter measures to reduce the risk of depletion. For global climate change, the assessments contributed to agreement on the need for

further measures beyond those contained in the United Nations Framework Convention on Climate Change. The assessments have also focused the scientific and technical community on the needs of decision makers to ensure more rapid progress in reducing uncertainties. The assessments have also contributed to capacity-building of scientific and technical expertise in developing countries.

6. Needs in this area include increased focus on the requirements of the policy maker and additional capacity-building in developing countries. Continued progress in reducing uncertainties for decisions will require better information in the areas of impacts and the social sciences. These areas are underfunded at the national level and coordination of activities at the international level is inadequate. Efforts are needed to enhance climate research, including studies of the biogeochemical processes in the climate system, improved understanding of the impact of land degradation on the land-atmosphere interactions and better systematic observations of the state of the atmosphere. Even though some progress in all these areas has been achieved, the level of scientific and technical expertise required by developing countries to protect the atmosphere requires further improvement.

B. Promoting sustainable development

7. This programme area focuses on activities addressing global climate change, although there are many complementary benefits for other environmental and development issues. Progress has been made at both the international and national levels. About 150 States and one regional economic integration organization have ratified the United Nations Framework Convention on Climate Change. Some parties have developed national action plans to implement the Convention. Perhaps most significantly, there is general agreement among the parties on the need for further measures to achieve the ultimate objective of the Convention. The parties have agreed to begin a process, the Berlin Mandate, to enable them to take appropriate action for the period beyond 2000, including the strengthening of the commitments of the parties listed in annex I to the Convention, through the adoption of a protocol or another legal instrument. Moreover, the task of putting the Convention institutions and processes into operation is well advanced.

8. Global atmospheric concentrations and emissions of the major greenhouse gases, however, continue to increase. Projections suggest that in the absence of concerted international effort, both will continue to increase, leading to an ever-increasing risk of irreversible global climate change. The primary impediments to action include uncertainty about the costs and benefits of emission-reduction strategies, international competitiveness concerns and socio-political considerations relating to patterns of consumption and production and to lifestyle. Research and development of new energy sources, improved energy efficiency, cleaner transportation and industrial technologies, and improved land-use practices could uncouple the association of greenhouse gas emissions and living standards.

9. Diffusion and transfer of technology resulting from this research and development, along with greater commitment to sustainable consumption patterns, would remove a major impediment to attaining sustainable development.

Considerable improvements have been achieved in energy exploration and development operations on land and offshore and have resulted in considerable expansion in the exploitation of the resource base, with higher productivity and quality.

10. Developed market economies have achieved a significant reduction in energy intensity due to improvements in the generation of energy and end-use efficiency in many socio-economic sectors. In these countries some progress has been made towards stabilizing emissions in accordance with their commitments under the Framework Convention.

11. Experiences in developing countries have varied considerably, even among those countries within the same region, because of the significant differences in their resources base, energy demand structures, economic situation, technological capacity, population and development strategy. Emissions from energy use will continue to rise with the increase in energy demand of these countries although it may be moderated by the decline in energy intensity as a consequence of the withdrawal of energy subsidies and improved efficiency in end-use.

12. In developed countries significant advances in transportation technology have resulted in substantial gains in efficiency and reductions in harmful emissions, but these gains could be offset by the increase in the amount and use of transportation equipment. In developing countries, environmental and socio-economic impacts from the transportation sector are becoming more and more serious, even over the short term. A growing number of cities in these countries are attempting to reduce congestion and pollution by building urban light rail systems, both above and below ground. Alternative fuels, particularly natural gas, are being gradually introduced. In the economies in transition, subsidized mass transport systems have been gradually phased out, and with the reversal in their economic downturn, emissions from their transport sector could increase again.

13. Pollution of the atmosphere from industrial activity in the developed market economies appears to have moderated over the past two decades with improved energy efficiency, conservation and the decarbonization of fuels. Major opportunities have been identified for further stabilization of emissions that will require changes in national policies. In developing countries end-use efficiency can be improved considerably by using available technologies; in the newly industrializing countries the environmental consequences of rapid industrialization are being increasingly felt, prompting increased spending on remedial actions and/or introducing cleaner production methodologies and technologies. In the economies in transition, end-use efficiency in industry and efforts to shift to cleaner production are under way with the support of bilateral and multilateral assistance programmes.

C. Stratospheric ozone depletion

14. The Montreal Protocol with its subsequent amendments and adjustments is widely viewed as a landmark for international cooperation and embodies many of the core principles of Agenda 21. International action was taken after observed

ozone depletion but in advance of observed impacts on human health or ecosystems. Thus, although earlier international action would have been desirable, the Protocol provides an example of the precautionary principle in action. The provisions for review of the Protocol have provided the flexibility to adjust measures with improved information. Mechanisms (including financial and technical assistance for developing countries) have been included to encourage the full participation of all countries in ozone protection, including developing countries and countries with economies in transition. Cooperation among Governments, environmental non-governmental organizations (NGOs), the scientific and technical community, and industry has led to rapid progress in addressing the issue.

15. Global production and consumption of the major ozone-depleting substances (ODS) have decreased markedly. Observations show a slowing, and in some cases a reversal, of the increases in atmospheric concentrations of major ODS. Nevertheless, the risk of ozone depletion is likely to continue to increase for the next three or four years and recovery of the ozone layer is projected to take 50 years or more. Health and environmental impacts are projected to continue even longer.

16. There are, however, some disturbing new trends. An illegal trade in chlorofluorocarbons (CFCs), the largest contributors to ozone depletion, has developed. Moreover, in a number of countries, the consumption of CFCs continues to increase.

D. Transboundary atmospheric pollution

17. Actions to address national issues in developed countries and agreements among developed countries have led to a reduction in transboundary air pollution and its impacts. Reductions in emissions that cause acid deposition and tropospheric ozone have been achieved despite increasing industrialization and transportation. The trend is towards continuous improvement in reducing the environmental impact due to transboundary atmospheric pollution in these countries.

18. Some developing countries, for example in Asia, have initiated programmes to address transboundary air pollution. Information on the quantity and impacts of transboundary pollution in developing regions is scarce. Activities projected to increase such emissions are increasing. There is an urgent need for developing countries to formulate agreements to address the issue before it seriously impacts on the environment and on the health of people. Given the competition for scarce resources to be allocated among different environmental issues, it is not easy for many developing countries to give air pollution issues sufficient priority.

E. Conclusions

19. Significant progress has been achieved in addressing uncertainties and improving the scientific basis for decision-making on an individual issue basis in developed countries. There are good prospects for the involvement of

developing countries in protection of stratospheric ozone and in negotiations to address global climate change. However, in order to promote faster progress towards sustainability, there are three major areas that require attention:

(a) Developing countries need further assistance and encouragement to ensure protection of the atmosphere;

(b) There should be a recognition of the linkage between individual issues and an increased focus on an integrated approach to addressing the problems. For example, many of the activities that involve ozone-depleting substances also use significant amounts of energy, and some of the substitutes for ODS are themselves greenhouse gases. Thus, care must be taken to manage greenhouse gas emissions during the phase-out of ODS;

(c) Increased attention should be given to sustainable resource management in addition to avoidance or correction of specific adverse environmental impacts, as is currently being done under regional and international agreements.

II. LINKAGES WITH OTHER PROGRAMME AREAS OF AGENDA 21

20. The relationship between sustainable development and atmospheric protection needs to be emphasized. Departure from the principles of one can significantly affect the other. In regard to linkages between the programme areas of Agenda 21, the following general areas deserve special attention.

21. Chapter 9 makes reference to programme area A of chapter 2 (Promoting sustainable development through trade). Provisions of the Montreal Protocol to restrict trade in ODS addresses this reference. Coordination with international trade organizations to ensure compatibility of rules is under investigation. Furthermore, programme area B of chapter 2 (Making trade and environment mutually supportive) appears to be more relevant here given the illegal trade activity in CFCs.

22. Perhaps the most significant link is with chapters 10 through 16, involving sustainable management of ecosystems and natural resources. Ecosystems depend on protection of the atmosphere, to ensure their health. They also exchange gases with the atmosphere, thereby influencing atmospheric composition. In particular, forest ecosystems serve as essential sinks of greenhouse gases and carbon reservoirs, while degraded dryland surfaces change the heat balance of the atmosphere. Increased attention is required to the coordinated evaluation and management of the atmosphere and ecosystems.

23. As requested in paragraph 17.26 of Agenda 21, the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities was adopted in Washington, D.C. in November 1995. It contains elements related to atmospheric protection. Protection of the marine environment from land-based activities involves persistent organic pollutants (POPs) and some heavy metals that are dispersed through the atmosphere.

24. There are critical linkages with chapter 4 (Changing consumption patterns), with its focus on the underlying driving forces behind unsustainable development - for example "Encouraging greater efficiency in the use of energy and resources" (programme area B, activity (a)). Chapters 33 and 34 are also relevant in that they address financial mechanisms and cooperation in the transfer of environmentally sound technology.

III. POLICY RECOMMENDATIONS

25. Policies have been instituted or are under negotiation to address all the currently identified major atmospheric issues on an individual basis, except for transboundary air pollution in developing countries. Implementation in developed countries is, in some cases, inadequate and developing countries are only beginning to institute policies and actions to address the issues. The policies represent international or regional agreements that are being implemented at the national level. The policy gaps include:

(a) Addressing atmospheric protection issues in a comprehensive fashion;

(b) Atmospheric protection measures to be taken by developing countries.

26. Policies should be adopted to address atmospheric protection issues on a comprehensive and resource management basis. Energy production and consumption, transportation and activities related to agricultural land use are significant contributors to atmosphere-related problems. Moreover, there are environmental problems with long time lags between cause and effect, resulting in the potential for bequeathing environmental debts to succeeding generations. One environmental problem must not be solved at the expense of another. The existing conventions, protocols and regional agreements need not hinder the adoption of comprehensive policies. At a minimum, mechanisms must be sought to ensure that the linkages between the atmospheric issues are properly addressed. Another alternative is to develop policies to commit national Governments to implementing regional and international agreements in a comprehensive fashion. In either case, a comprehensive approach will require additional international scientific and technical research and assessments of all related environmental issues resulting from human activities. The precautionary approach should be applied through preventive and corrective measures based on current knowledge.

27. There is a common but differentiated responsibility among countries for atmospheric protection. Policies should be adopted to increase developing country actions to protect the atmosphere from adverse change. Developing countries are faced with a wide range of development and environmental problems perceived as being more immediate than the global or regional atmospheric issues that are projected to affect future generations. Often the knowledge, expertise, infrastructure, or financial resources to address the issues are not available. Nevertheless, actions to protect the environment are enacted at the national level. To ensure appropriate integration into the local culture and social structure, solutions should be formulated within a country. Priority should be given to national air quality policy within developing countries, addressing the balance between economic development and its impact on the environment and human health within cities and the areas close to them, which

are themselves air pollution sources. There is a need for combining financial and technical assistance and local expertise with the objective of integrating environmental protection into the sustainable development plans of individual nations.

Policy instruments to control anthropogenic impacts

28. There are numerous mitigation options for the protection of the atmosphere. No single mitigation option will become the unique and universally adopted solution if drastic reductions of emissions from industrial, energy and consumption activities are required. All options must be evaluated in their different regional, national or sectoral contexts. A combination of several mitigation options along improved and new technology chains, plus associated synergies, will be needed to achieve substantial emission reductions. While these combinations may be region- or sector-specific and could involve new technology chains and synergisms, such as a stronger reliance on carbon-free energy carriers in the energy sector, they must take into account the potential impact on other environmental sectors, avoiding transferred costs and securing benefits across a broader spectrum of issues beyond those specifically addressed.

29. Special consideration must be given to policies that foster the adoption of mitigation technologies that enhance economic development without undermining global environmental sustainability. Policy instruments that promote increases in the supplies of high-quality energy services and growth of per capita income and living standards should receive the highest priority in developing countries. In the industrialized countries, where per capita energy consumption levels and incomes are high, policies are called for to reduce emissions without causing a loss of useful energy services.

30. High priority must be given to efficiency improvements to achieve cleaner and higher-quality energy services while mitigating adverse environmental impacts. Efficiency improvements are particularly attractive as a target for policy instruments since they can generate such multiple benefits as lower resource consumption, reduced environmental impacts and lower system costs.

31. Another class of options that can also generate multiple benefits is the decarbonization of the energy system. The lower the carbon content of fuels, the lower are the environmental impacts on local air quality as well as CO_2 emissions.

32. In the near term, the most promising areas for the application of market (taxes, fees, tax exemptions, subsidies, activities implemented jointly, tradeable permits, polluter pays principles, etc.) and non-market (information, advertisements, education, standards, legal and institutional regulations, bans, controls, etc.) instruments are the energy end-use sectors. Some of the above are applicable for the control of ozone-depleting substances and other atmospheric pollutants. Market and non-market policy instruments need to focus increasingly on the energy end-use sector since efficiency improvements in this sector are the key to meeting the objective of sustainable development.

33. Regulation has been the dominant environmental policy instrument at the national and regional levels. Recently, economic and market-oriented approaches have gained momentum compared with non-market instruments. The application of market instruments at the macroeconomic level is intended to establish undistorted pricing mechanisms and competitiveness. Policy instruments for fully internalizing environmental externalities and abolishing subsidies must be put in place. Adequate financing is necessary since even in industrialized countries, where financing for capital-intensive projects is easier to obtain, there are major barriers to efficiency improvements and energy sector restructuring and decarbonization at the national level. The promotion of flexible, small-scale but mass-produced supply and conversion plants and equipment would help to resolve some of the financing difficulties by reducing the risk, uncertainty and capital requirements.

IV. ACTIONS REQUIRED AT THE NATIONAL, REGIONAL AND INTERNATIONAL LEVELS

34. The following actions are required at the national level:

- States should ratify and implement all relevant conventions, protocols and regional agreements related to the protection of the atmosphere and climate.

- States should ensure that the regional and international bodies supporting the conventions, protocols and agreements are adequately funded and supported by national experts.

- States should implement existing international and regional agreements in a comprehensive, mutually reinforcing manner and, by doing so, avoid creating or enhancing other environmental issues while solving the one in hand.

- States should develop, as a matter of priority, national environmental programmes to address the protection of the atmosphere, including major local environmental air quality issues such as urban pollution emissions from industrial complexes and accidental release of hazardous material into the atmosphere.

- States should encourage actions at the local as well as the national level beyond those required by regional or international agreements which contribute to atmospheric protection.

- States should enhance research programmes, especially in the areas concerning human dimensions and environmental impacts of atmospheric change, and systematic observation of the atmospheric and related parameters to improve the basis for decision-making. Cooperation and collaboration of experts in developed and developing countries should be encouraged to obtain the dual benefits of capacity-building and expanding the information base.

- States should encourage broader participation by all stakeholders including environmental NGOs, industries, communities and academic institutions in the formulation and implementation of atmospheric protection strategies. Multidisciplinary approaches to policy determination involving both social and physical scientists must also be pursued.

- States should enhance research and development activities aimed at providing innovative solutions for atmospheric protection.

- States should carefully review the financial contributions to such mechanisms as the Global Environment Facility and the Montreal Protocol Multilateral Fund to ensure that resources are sufficient to assist developing countries in implementing their commitments.

35. At the regional level, the major gap is addressing transboundary atmospheric pollution in developing countries. Developed countries should enhance programmes to share management experience, scientific expertise and information on technical mitigation options with developing countries where transboundary pollution is most likely to become an issue. Developing nations in these regions should start formulating a framework for action.

36. The following actions are required at the international level:

- Efforts should be intensified to enhance coordination between various conventions, protocols and regional agreements to protect the atmosphere. The goal should be ensuring ways to address linkages of environmental issues being managed by these agreements.

- There is a need for a better coordinated institutional approach to provide comprehensive scientific, technical and economic assessments of the major human activities contributing to atmospheric modification. The goal is to provide the basis for integrated management of those activities.

- Political support is needed for the inter-agency initiative for an integrating framework for the international climate-related programmes - The Climate Agenda. This would facilitate the provision of the resources necessary to implement international climate-related activities, including research programmes and systematic observations, and to promote national climate-related activities and in turn contribute to the implementation of the United Nations Framework Convention on Climate Change.

Notes

1/ Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.